



## General

### Guideline Title

Guidelines for the practice and performance of manipulation under anesthesia.

### Bibliographic Source(s)

Gordon R, Cremata E, Hawk C. Guidelines for the practice and performance of manipulation under anesthesia. *Chiropr Man Therap*. 2014 Feb 3;22(1):7. [22 references] [PubMed](#)

### Guideline Status

This is the current release of the guideline.

## Regulatory Alert

### FDA Warning/Regulatory Alert

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- [December 14, 2016 – General anesthetic and sedation drugs](#) : The U.S. Food and Drug Administration (FDA) is warning that repeated or lengthy use of general anesthetic and sedation drugs during surgeries or procedures in children younger than 3 years or in pregnant women during their third trimester may affect the development of children's brains. Consistent with animal studies, recent human studies suggest that a single, relatively short exposure to general anesthetic and sedation drugs in infants or toddlers is unlikely to have negative effects on behavior or learning. However, further research is needed to fully characterize how early life anesthetic exposure affects children's brain development.

## Recommendations

### Major Recommendations

#### Protocols and Standards

Patient Selection: Clinical Candidacy for Manipulation Under Anesthesia (MUA)

See the original guideline document for information about the factors that qualify a patient for clinical candidacy for MUA.

#### Diagnosis

## Establishing Medical Necessity

Every condition treated must be diagnosed and justified by clinical documentation in order to establish medical necessity. Documentation of the patient's progress and the patient's response to treatment are combined to confirm the working diagnosis.

See the original guideline document for information about the diagnoses that are most responsive to MUA.

## Frequency and Follow-up Procedures

### Determining the Necessity and Frequency of MUA

The following should be considered when determining the necessity and frequency of MUA:

- Patient's response and progress to previous conservative care
- Consideration of activities of daily living and disability
- Patient's psychological acceptance of the MUA procedure, and psychosomatic response to overcoming chronic pain and discomfort
- Prevention of additional gross deterioration
- Prevention of possible surgical intervention
- Chronicity
- Length of current treatment and patient progress
- Patient's age
- Number of previous injuries to the same area
- Level of pain considering standard 4-8 week minimum protocol parameters and deciding whether a variation from the guidelines may be appropriate for the individual patient's needs
- Patient's tolerance of previous treatment procedures and their success or failures
- Muscle contraction level (beyond splinting)
- Response to previous MUAs based on objective clinical documentation and protocols for determining patient progress
- Fibrous adhesion from failed back surgery or prior injury
- Patient willingness and availability to participate in appropriate post-procedures follow-up to optimize results

### Protocols for Determining the Frequency of the MUA Procedure

A treatment plan of three consecutive days of treatment is recommended, on the rationale that serial procedures allow a gentler yet effective treatment plan with better control of biomechanical force resulting in increased safety, and more focused and effective subsequent procedures after monitoring the effects of those administered previously.

Ranges of motion should always be measured after an appropriate warm-up period for consistency and as recommended within the American Medical Association Impairment Guidelines.

- Single spinal MUA is most often recommended for younger patients; when the area to be treated has not been previously injured; and when the verifiable global and intersegmental motion restrictions are relatively mild.
- Single spinal MUA is most often recommended when conservative care has been rendered for a sufficient time (usually a 4-6 week minimum) and the patient's activities of daily living or work activities are interrupted in such a fashion as to warrant a more aggressive approach.
- If the patient is treated for intractable pain with a single MUA procedure and responds with 80% symptomatic and functional resolution, the necessity for future MUAs should be considered and depends in part on the objective parameters determined during and after the MUA procedures.
- Serial MUA is recommended when the patient's condition is chronic and when conservative care as described in this guideline has been rendered.
- Serial MUA is recommended when the injury is recurrent in nature and fibrotic tissue and articular fixation prevents a single MUA from being optimally effective.

### Parameters for Determining MUA Progress

Parameters for determining MUA progress may include, but are not limited to:

- Subjective changes
- Patient's pain index, visual analogue scale, faces of pain

- Patient's ability to engage in active range of motion
- Patient's change in activities of daily living
- Patient's change in job performance
- Objective changes
- Change in measurable muscle mass, function, and strength
- Change in muscle contractibility
- Change in electromyography and/or nerve conduction studies
- Change in controlled measurable passive range of motion
- Change in diagnostic studies (X-rays, computed tomography, magnetic resonance imaging), including functional radiography

### General Post MUA Therapy

#### Therapy Following First MUA

- Repeat MUA stretching
- Physiotherapeutic modalities as indicated by patient presentation
- Patient to rest at home with walking and range of motion exercises encouraged to patient tolerance

#### Therapy Following Subsequent MUAs

- Same as 1st day
- No further manipulation should be required.
- May add proprioceptive neurofacilitation protocols. These can be incorporated during stretching if tolerated.

#### Therapy Following Last MUA

- Same protocol as above with proprioceptive neurofacilitation
- Additional home instructions to include range of motion and strengthening exercises as condition permits and to patient tolerance can be provided to the patient at this time

#### Follow-up Therapy Following MUA—One Week after Last MUA

Treatment frequency during the first week should be 3-4 days dependent on the individual patient's needs. These follow-up procedures should include all fibrosis release and manipulative procedures performed during the MUA procedure to help prevent re-adhesion.

#### Follow-up Therapy Following MUA—Weeks 2 and 3 after Last MUA

- Continue full protocols to include fibrosis release procedures, proprioceptive neurofacilitation, and manipulative procedures as needed to maintain global and intersegmental motion improvements obtained during the MUA procedure.
- Begin home rehabilitation exercises 2-3 times per week.

#### Follow-up Therapy Following MUA—Weeks 7-8 after Last MUA

- Continue full protocol (fibrosis release procedures, proprioceptive neurofacilitation and manipulative procedures).
- Patient treated 1-2 times per week for 4-5 weeks depending on patient needs.
- Active progressive resistive strength/stabilization exercises, supervised/unsupervised 2-3 times per week; optimal rehabilitative procedures should include attention to aerobic, flexibility, strength, and coordination considerations.

See the original guideline documents for information on the following topics:

- Safety, including patient safety, doctor safety, and facilities
- Compensation
- Anesthesia standards for outpatient MUA
- Nursing standards—patient care responsibilities

## Clinical Algorithm(s)

None provided

# Scope

## Disease/Condition(s)

Spine-related pain

## Guideline Category

Management

Rehabilitation

Treatment

## Clinical Specialty

Anesthesiology

Chiropractic

Internal Medicine

Nursing

Physical Medicine and Rehabilitation

## Intended Users

Advanced Practice Nurses

Chiropractors

Hospitals

Nurses

Physical Therapists

Physician Assistants

Physicians

## Guideline Objective(s)

To develop evidence-informed and consensus-based guidelines on spinal manipulation under anesthesia to address the gaps in the literature with respect to patient selection and treatment protocols

## Target Population

Adults with chronic spine-related pain

## Interventions and Practices Considered

1. Patient selection for manipulation under anesthesia (MUA)

2. Establishing medical necessity for MUA
3. Determining frequency of the MUA procedure
4. Use of parameters for determining MUA progress
5. Therapy following MUA procedures (e.g., physical therapy, strengthening exercises)
6. Follow-up therapy
7. Ensuring patient and doctor safety during MUA procedures
8. Anesthetic procedures pre-, intra-, and post-MUA
9. Nursing care pre-, intra-, and post-MUA

## Major Outcomes Considered

- Effectiveness of manipulation under anesthesia (MUA) procedures for relieving pain and increasing range of motion
- Safety

## Methodology

### Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

### Description of Methods Used to Collect/Select the Evidence

A PubMed literature search (publication dates from January 1, 2002 to June 30, 2013 and including only English language articles) using the term "manipulation under anesthesia" was performed. The PubMed search returned 84 results, which were hand sorted. Articles that were not reviews, did not address human subjects, or addressed extremities only were excluded leaving one narrative review (2013). Using the reference list of the narrative review, 133 additional articles were identified. From this, articles that were not about MUA, were from before 2002, were not review articles, were books or non-peer-reviewed articles, were about extremities only, or were commentaries were excluded leaving two reviews (2002 and 2008). The secondary sources (reviews) were the primary references used for evaluating the evidence related to manipulation under anesthesia (MUA), with emphasis on the most recent review (2013).

### Number of Source Documents

Three reviews

### Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

### Rating Scheme for the Strength of the Evidence

Definition of Levels of Evidence for Treatment Results\*

| Level I                 | Level II                | Level III               | Level IV    | Level V                   |
|-------------------------|-------------------------|-------------------------|-------------|---------------------------|
| High-quality RCT        | Prospective cohort      | CC                      | Case series | Expert opinion            |
| SR of high-quality RCTs | Poor-quality RCT        | Retrospective cohort    |             | Case reports <sup>1</sup> |
|                         | SR of above study types | SR of above study types |             |                           |

## Methods Used to Analyze the Evidence

### Systematic Review

## Description of the Methods Used to Analyze the Evidence

The evidence was assessed using the scheme described in the 2003 *Journal of Bone & Joint Surgery*, which is commonly used in musculoskeletal medicine. Definitions of the levels of evidence in this scheme are summarized in the "Rating Scheme for the Strength of the Evidence" field.

The evidence for treatment effects of manipulation under anesthesia (MUA) consisted of Levels II, IV and V. Level II evidence included three prospective cohort studies and three reviews (narrative review, 2013) and (systematic reviews 2008 and 2002). The remaining published literature on MUA consisted of Level IV studies (case series) and Level V studies (case reports and expert opinion).

## Methods Used to Formulate the Recommendations

### Expert Consensus (Delphi)

## Description of Methods Used to Formulate the Recommendations

### Preparation for Delphi Panel

All three published reviews were provided to the Delphi panel at the beginning of the project as background documents. The core committee, two of whom are experienced manipulation under anesthesia (MUA) practitioners who have been active in guideline development for MUA and one who is experienced in conducting consensus projects for guideline development, developed 43 seed statements, based on previous MUA guidelines and the background documents.

### Delphi Consensus Panel

The project was determined to be exempt (P/N 2013-017) by the Institutional Review Board of Life Chiropractic College West prior to conducting the Delphi process. An expert consensus process was conducted using the Delphi method. Because a Delphi panel is made up of experts, individuals were selected on the basis of their established expertise in the area of spine-related care. Both individuals who practice MUA and those who provide spinal care without MUA were identified, to avoid bias toward MUA practice. Laypersons familiar with spine-related care, such as insurance specialists and attorneys, were also included. A list of 24 panelists to be invited included healthcare providers who had published on MUA, were MUA practitioners, were experienced Doctors of Chiropractic (DCs) who did not practice MUA but had a practice emphasis in chronic spinal pain and were familiar with guideline development, and several laypersons with healthcare experience such as insurance specialists and attorneys. Medical doctors (MD) (anesthesiologists and other specialists), osteopathic and chiropractic physicians were included, as well as registered nurses (RNs). A total of 16 panelists accepted, of which 10 (63%) were DCs. Panelists included 1 MD anesthesiologist, 2 MDs in other medical specialties, 2 RNs who work on MUA teams, 6 DCs who practice MUA, 4 DCs who do not practice MUA, and 1 attorney. Of the DCs, all were practitioners and 5 were also on the faculty of 5 different chiropractic colleges. There were 13 (81%) male and 3 (19%) female panelists, with a mean of 23 years professional experience (median 25 years). States represented were California (5), Florida (4), Texas (2) and 1 each from Georgia, North Carolina, New York, and Tennessee; one panelist resides in Malaysia. Most of the DCs were road-scope in terms of practice approach, meaning that they utilized a number of procedures in addition to manipulation.

### Delphi Process

The Delphi process was conducted by e-mail. Each set of seed statements to be rated was identified by an identification (ID) number. Only the project coordinator could link the ID to the panelists' names, for purposes of distribution and follow-up. The Delphi process was conducted in a blinded manner, so that neither the panelists nor the core committee knew the identity of the raters or those who had made any individual comments, during the development of consensus. The guideline developers used the widely-used and well-established RAND-UCLA consensus

process methodology in rating the seed statements. An ordinal rating scale ranging from 1 (highly inappropriate) to 9 (highly appropriate) was used. The guideline developers explained that by "appropriateness" (as specified by RAND/UCLA), "we mean that the expected health benefit to the patient exceeds the expected negative consequences by a sufficiently wide margin that it is worth doing, exclusive of cost."

In scoring, ratings of 1-3 indicated "inappropriate"; 4-6 "undecided"; and 7-9 "appropriate". Panelists rating a statement as "inappropriate" were required to give a specific reason and, if possible, provide a reference from the peer-reviewed literature to support it. There was unlimited space provided for panelists to make comments, and the project coordinator entered all comments into a Word file, identified by ID number, rating and seed statement number. The project coordinator entered the numerical ratings into an SPSS v.21.0 database and one of the investigators analyzed the results, computing the median rating and percentages of agreement for each statement. The guideline developers considered consensus present when both the median rating was 7 or higher and at least 80% of the panelists gave a rating of 7 or higher. Rounds were to be repeated until consensus was reached.

The core committee reviewed all comments and revised the statements on which consensus was not reached, based on the panelists' comments. The project coordinator then circulated the revised statements, along with the de-identified comments, to the entire panel for the next round.

#### Delphi Process and Panelist Summary

The Delphi process was conducted from August to October 2013. Fifteen panelists of the 16 participated in each of the two Delphi rounds, although one panelist of the 16 participated in only Round 1 and a different panelist only participated in Round 2. Consensus on all was reached on 38 of the 43 statements after one round, and consensus on the remaining 5 statements after the second round.

## Rating Scheme for the Strength of the Recommendations

Not applicable

## Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

## Method of Guideline Validation

External Peer Review

Internal Peer Review

## Description of Method of Guideline Validation

The Delphi panel that developed this guideline was composed of experienced physicians, nurses and educators, both practitioners of manipulation under anesthesia (MUA) and practitioners who do not practice MUA but are experienced in the treatment of spine-related pain. This group reached a high level (80%) of consensus on recommendations related to the practice of MUA. This lends clinical validity to the recommendations and therefore should guide MUA practitioners.

## Evidence Supporting the Recommendations

### Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

The evidence consisted of a narrative reviews and two systematic reviews.

## Benefits/Harms of Implementing the Guideline Recommendations

## Potential Benefits

- Appropriate practice and performance of manipulation under anesthesia (MUA)
- Improved safety for patients being treated with MUA

## Potential Harms

The co-attending doctor is an integral part of this procedure and is responsible for helping the primary doctor move the patient through the prescribed ranges of motion. The co-attending doctor is present to insure that all movements are accomplished without injury to the patient or to the primary doctor performing the procedure. As a result of the added potential risk to the patient in a sedated state, there is a high risk of injury to the doctor and the patient if only one doctor were to attempt the complex techniques necessary for the manipulation under anesthesia (MUA) procedure. Inclusion of a co-attending doctor, who is a certified MUA practitioner, is the safest way to perform this procedure. It may be unsafe to perform an MUA without a competent and knowledgeable MUA doctor as the co-attending doctor and anything other than allowing another MUA certified doctor to act as a co-attending doctor imposes potential risks. By using a certified MUA practitioner as a co-attending doctor, optimal effectiveness and safety standards are maintained. Refer to the original guideline document for additional information on patient and doctor safety.

## Qualifying Statements

### Qualifying Statements

- This guideline is intended for practitioners, facilities, and other interested parties. Decisions to adopt particular courses of action must be made by trained practitioners on the basis of the available resources and the particular circumstances of the individual patient. This guideline is not to be applied to any specific patient, in any manner, and any decision requiring necessary testing, patient candidacy or follow-up procedures must be made by the individual doctor and determined by the needs of the patient. Safety and effectiveness should drive the doctor's decision when considering Manipulation Under Anesthesia (MUA) protocols. This guideline is not intended for utilization review purposes. The American Association of Manipulation Under Anesthesia Physicians denies responsibility for any injury or damage resulting from actions taken by practitioners after considering this guideline.
- This guideline is not intended to be prescriptive, or to suggest that MUA is the only therapy of choice when seeking relief for spinal dysfunction and pain. It is intended to provide practitioners with evidence-informed, consensus-based parameters guiding the use of MUA.

## Implementation of the Guideline

### Description of Implementation Strategy

An implementation strategy was not provided.

## Institute of Medicine (IOM) National Healthcare Quality Report Categories

### IOM Care Need

Getting Better

Living with Illness

### IOM Domain

Effectiveness

Patient-centeredness

Safety

## Identifying Information and Availability

### Bibliographic Source(s)

Gordon R, Cremata E, Hawk C. Guidelines for the practice and performance of manipulation under anesthesia. *Chiropr Man Therap*. 2014 Feb 3;22(1):7. [22 references] [PubMed](#)

### Adaptation

Not applicable: The guideline was not adapted from another source.

### Date Released

2014 Feb 3

### Guideline Developer(s)

American Association of Manipulation Under Anesthesia Providers - Nonprofit Organization

### Source(s) of Funding

American Association of Manipulation Under Anesthesia Providers

### Guideline Committee

Not stated

### Composition of Group That Authored the Guideline

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### Financial Disclosures/Conflicts of Interest

The American Association of Manipulation Under Anesthesia Providers provided consultant fees for Dr. Hawk's role on the project. She served as an independent contractor to the project, which is not associated with her position at Logan University. RG and EC have no financial interest in any part of the process and have not received any remuneration for their part in this project. Both RG and EC practice manipulation under anesthesia and teach it in post-graduate education. The authors declare that they have no competing interests.

### Guideline Status

This is the current release of the guideline.

## Guideline Availability

Electronic copies: Available on the [Chiropractic & Manual Therapies Web site](#) .

## Availability of Companion Documents

None available

## Patient Resources

None available

## NGC Status

This NGC summary was completed by ECRI Institute on August 1, 2014. The information was verified by the guideline developer on August 14, 2014. This summary was updated by ECRI Institute on February 15, 2017 following the U.S. Food and Drug Administration advisory on general anesthetic and sedation drugs.

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